

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-257897  
(43)Date of publication of application : 08.10.1993

(51)Int.Cl. G06F 15/02  
H04B 7/26

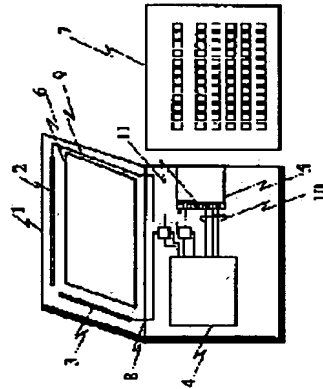
(21)Application number : 04-057676 (71)Applicant : HITACHI LTD  
(22)Date of filing : 16.03.1992 (72)Inventor : AMADA EIICHI

(54) RATIO ANTENNA INCORPORATED SMALL-SIZED COMPUTER

(57)Abstract:

**PURPOSE:** To provide the small-sized computer which has an inexpensive, good- performance radio transmitting and receiving function.

**CONSTITUTION:** Radio antennas 2 and 3 are incorporated in the small-sized computer previously and electric conductors 8 and 9 are provided between the internal radio antennas 2 and 3 and a slot 5 for an option device; and a radio transmitter and receiver and the general option device is selectively mounted in the option device slot 5 and the small-sized computer 1 is put in operation. The internal radio antennas 2 and 3 are connected to the radio transmitter and receiver inserted into the option device slot 5 and then the small-sized radio transmitter and receiver having no antenna is applicable as an optional device.



## LEGAL STATUS

[Date of request for examination]  
[Date of sending the examiner's decision of rejection]  
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]  
[Date of final disposal for application]  
[Patent number]  
[Date of registration]  
[Number of appeal against examiner's decision of rejection]  
[Date of requesting appeal against examiner's decision of rejection]  
[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

**\* NOTICES \***

**JPO and NCIPJ are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**CLAIMS**

[Claim(s)]

[Claim 1] The radio antenna built-in minicomputer characterized by having wiring for connecting with the optional equipment in which the radio antenna and the radio antenna were inserted by the body of a minicomputer at the slot in the minicomputer which has a slot for incorporating an optional equipment.

[Claim 2] The radio antenna built-in minicomputer according to claim 1 characterized by having a switching means for changing the connection relation between said radio antenna, the processor of a minicomputer, and the optional equipment inserted in said slot.

[Claim 3] The radio antenna built-in minicomputer according to claim 2 with which said switching means is characterized by being controlled by the processor in said minicomputer.

[Claim 4] The radio antenna built-in minicomputer according to claim 2 characterized by having a manual switch for switching said switching means.

---

[Translation done.]

## \* NOTICES \*

### **JP0 and NCIP1 are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention builds in a radio antenna and relates to the computer of the pocket mold which sends and receives information mutually using wireless.

[0002]

[Description of the Prior Art] Two approaches are learned as construction of the small pocket computer having a wireless transmitter-receiver. The 1st approach, "as wireless in building network architecture and pro TOKORUZI (Wireless In-building Network Architecture and Protocols), the IEEE NETCHI work-piece magazine (IEEE NetworkMagazine), and the November, 1991 issue will see, it is the approach of installing a wireless transmitter-receiver out of a computer, and connecting with a wireless transmitter-receiver with the interface which had between computers standardized. The 2nd approach is the approach of inserting a wireless transmitter-receiver in the slot for optional equipments, and connecting between wireless transmitter-receivers with an antenna by the cable by making only an antenna external as adopted with the U.S. black-box company product "BestLAN." The two above-mentioned approaches are the optimal approaches for adding a wireless transmitter-receiver to the existing computer.

[0003]

[Problem(s) to be Solved by the Invention] However, since the wireless transmitter-receiver or the antenna is outside exposed when the above-mentioned approach is applied to the minicomputer of a pocket mold, there is a problem that it is remarkable to a cellular phone and inconvenient to it. Therefore, it is desirable to build a radio antenna in a small pocket computer.

[0004] Moreover, when equipping the slot for inserting an optional equipment

with a wireless transmitter-receiver and considering the utilization gestalt which does not use a wireless transmitter-receiver not using a wireless transmitter-receiver, it is desirable that it can be used being able to insert other optional equipments.

[0005] In this case, since a slot is equipped with the optional equipment of a different class, the connection method between the built-in antenna not affecting and a wireless transmitter-receiver is needed for the interface of other optional equipments.

[0006]

[Means for Solving the Problem] In order to solve the above-mentioned problem, when wiring between a built-in radio antenna and the slot connector for optional equipments is beforehand equipped in the minicomputer, a switch is formed between the above-mentioned built-in antenna and the connector for optional equipments and the above-mentioned connector is equipped with a transmitter-receiver, by this invention, it is characterized by enabling it to connect the above-mentioned built-in antenna and a transmitter-receiver.

[0007]

[Function] According to this invention, by equipping the minicomputer with wiring between a built-in radio antenna and the slot connector for optional equipments beforehand, a radio antenna becomes unnecessary at an external transmitter-receiver machine, and a transmitter-receiver machine can be miniaturized. moreover, it becomes possible to use it, inserting a wireless transmitter-receiver in a slot, without changing the interface of other optional equipments by being alike between a built-in antenna and the connector for optional equipments, forming a switch, and connecting a built-in antenna to the slot connector for optional equipments selectively.

[0008]

[Example] Drawing 1 and drawing 2 are the block diagrams showing the 1st example of the note type personal computer which applied this invention. Drawing 1 has shown the condition of having removed the keyboard 7 from the body 1 of a personal computer. Two antennas 2 and 3 are built in the upper part and the left end of the liquid crystal side 6, and these antennas are connected to the connector 11 for optional equipments via wiring 8, 9, 15, and 18 and switches 12 and 13. In this example, in order to make diversity reception possible and to raise the receiving engine performance, two antennas 2 and 3 are used.

[0009] As switches 12 and 13 are shown in drawing 2, it is controlled by control signals 14 and 17, respectively, and antennas 2 and 3 are connected with the connector 11 for optional equipments at the time of a wireless activity. Moreover, the conventional optional equipment is made connectable by connecting a processor 4 to a connector 11 (optional equipment) at the time of other optional equipment activities. Since it has composition with

which switches 12 and 13 are controlled by the microprocessor (or board which carried the microprocessor) 4 in this example, it is possible to switch switches 12 and 13 automatically by the microprocessor (or board which carried the microprocessor) 4 by distinguishing automatically the class of optional equipment inserted in the slot 5 for optional equipments. In addition, drawing 3 and drawing 4 which are wiring for 10 to connect the slot for optional equipments and a processor 4 show the 2nd example of this invention. A switch 20 is newly added, and it constitutes from the 2nd example so that switches 12 and 13 may be switched with the above-mentioned switch 20. Therefore, in this example, the user of a personal computer operates a switch 20 according to the device inserted in the slot 5 for optional equipments, and changes connection between the connector 11 for optional equipments, antennas 2 and 3, and a processor 4. [0010] In addition, you may make it control control of the above-mentioned switches 12 and 13 by the switch which operates according to the edge configuration of the optional equipment installed in the connector 11. In this case, a switch of switches 12 and 13 is automatically attained only by inserting an optional equipment or a transmitter-receiver in a slot.

[0011]

[Effect of the Invention] As explained above, in order according to this invention to build the antenna for radiocommunication in the minicomputer beforehand and to connect a transmitter-receiver if needed, the body of a computer can be offered cheaply and a powerful wireless function is obtained. Moreover, it becomes possible to use the conventional optional equipment, without changing the interface.

[Translation done.]

\* NOTICES \*

**JPO and NCIP1 are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Industrial Application] This invention builds in a radio antenna and relates to the computer of the pocket mold which sends and receives information mutually using wireless.

[Translation done.]

**\* NOTICES \***

**JP0 and NCIP1 are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

**PRIOR ART**

[Description of the Prior Art] Two approaches are learned as construction of the small pocket computer having a wireless transmitter-receiver. The 1st approach, "as wireless in building network architecture and pro TOKORUZU (Wireless In-building Network Architecture and Protocols), the IEEE NETCH1 work-piece magazine (IEEE NetworkMagazine), and the November, 1991 issue will see, it is the approach of installing a wireless transmitter-receiver out of a computer, and connecting with a wireless transmitter-receiver with the interface which had between computers standardized. The 2nd approach is the approach of inserting a wireless transmitter-receiver in the slot for optional equipments, and connecting between wireless transmitter-receivers with an antenna by the cable by making only an antenna external as adopted with the U.S. black-box company product "BestLAN." The two above-mentioned approaches are the optimal approaches for adding a wireless transmitter-receiver to the existing computer.

[Translation done.]

**\* NOTICES \***

**JP0 and NCIP1 are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

**EFFECT OF THE INVENTION**

[Effect of the Invention] As explained above, in order according to this invention to build the antenna for radiocommunication in the minicomputer beforehand and to connect a transmitter-receiver if needed, the body of a computer can be offered cheaply and a powerful wireless function is obtained. Moreover, it becomes possible to use the conventional optional equipment, without changing the interface.

[Translation done.]

**\* NOTICES \***

**JPO and NCIP1 are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

**TECHNICAL PROBLEM**

[Problem(s) to be Solved by the Invention] However, since the wireless transmitter-receiver or the antenna is outside exposed when the above-mentioned approach is applied to the minicomputer of a pocket mold, there is a problem that it is remarkable to a cellular phone and inconvenient to it. Therefore, it is desirable to build a radio antenna in a small pocket computer.

[0004] Moreover, when equipping the slot for inserting an optional equipment with a wireless transmitter-receiver and considering the utilization gestalt which does not use a wireless transmitter-receiver not using a wireless transmitter-receiver, it is desirable that it can be used being able to insert other optional equipments.

[0005] In this case, since a slot is equipped with the optional equipment of a different class, the connection method between the built-in antenna not affecting and a wireless transmitter-receiver is needed for the interface of other optional equipments.

[Translation done.]

**\* NOTICES \***

**JPO and NCIP1 are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

**MEANS**

[Means for Solving the Problem] In order to solve the above-mentioned problem, when wiring between a built-in radio antenna and the slot connector for optional equipments is beforehand equipped in the minicomputer, a switch is formed between the above-mentioned built-in antenna and the connector for optional equipments and the above-mentioned connector is equipped with a transmitter-receiver, by this invention, it is characterized by enabling it to connect the above-mentioned built-in antenna and a transmitter-receiver.

[Translation done.]

**\* NOTICES \***

**JP0 and NCIP1 are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**OPERATION**

[Function] According to this invention, by equipping the minicomputer with wiring between a built-in radio antenna and the slot connector for optional equipments beforehand, a radio antenna becomes unnecessary at an external transmitter-receiver machine, and a transmitter-receiver machine can be miniaturized. moreover, it becomes possible to use it, inserting a wireless transmitter-receiver in a slot, without changing the interface of other optional equipments by being alike between a built-in antenna and the connector for optional equipments, forming a switch, and connecting a built-in antenna to the slot connector for optional equipments selectively.

---

[Translation done.]

## \* NOTICES \*

### **JP0 and NCIP1 are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

## EXAMPLE

[Example] Drawing 1 and drawing 2 are the block diagrams showing the 1st example of the note type personal computer which applied this invention. Drawing 1 has shown the condition of having removed the keyboard 7 from the body 1 of a personal computer. Two antennas 2 and 3 are built in the upper part and the left end of the liquid crystal side 6, and these antennas are connected to the connector 11 for optional equipments via wiring 8, 9, 15, and 18 and switches 12 and 13. In this example, in order to make diversity reception possible and to raise the receiving engine performance, two antennas 2 and 3 are used.

[0009] As switches 12 and 13 are shown in drawing 2, it is controlled by control signals 14 and 17, respectively, and antennas 2 and 3 are connected with the connector 11 for optional equipments at the time of a wireless activity. Moreover, the conventional optional equipment is made connectable by connecting a processor 4 to a connector 11 (optional equipment) at the time of other optional equipment activities. Since it has composition with which switches 12 and 13 are controlled by the microprocessor (or board which carried the microprocessor) 4 in this example, it is possible to switch switches 12 and 13 automatically by the microprocessor (or board which carried the microprocessor) 4 by distinguishing automatically the class of optional equipment inserted in the slot 5 for optional equipments. In addition, drawing 3 and drawing 4 which are wiring for 10 to connect the slot for optional equipments and a processor 4 show the 2nd example of this invention. A switch 20 is newly added, and it constitutes from the 2nd example so that switches 12 and 13 may be switched with the above-mentioned switch 20. Therefore, in this example, the user of a personal computer operates a switch 20 according to the device inserted in the slot 5 for optional equipments, and changes connection between the connector 11 for optional equipments, antennas 2 and 3, and a processor 4.

[0010] In addition, you may make it control control of the above-mentioned

switches 12 and 13 by the switch which operates according to the edge configuration of the optional equipment installed in the connector 11. In this case, a switch of switches 12 and 13 is automatically attained only by inserting an optional equipment or a transmitter-receiver in a slot

[Translation done.]



\* NOTICES \*

**JP0 and NCIP1 are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

DESCRIPTION OF DRAWINGS

---

[Brief Description of the Drawings]  
[Drawing 1] The whole computer block diagram showing the 1st example of this invention.  
[Drawing 2] The block diagram showing the important section in the above-mentioned example.  
[Drawing 3] The whole computer block diagram showing the 2nd example of this invention.  
[Drawing 4] The block diagram showing the important section in the above-mentioned example.  
[Description of Notations]  
1 [ --- The slot for optional equipments, 6 / --- Liquid crystal, 7 / --- A keyboard, 8, 9 10 15, 18 / --- Wiring, 11 / --- 12 The connector for optional equipments, 13 / --- 14 The switch for a signal change 17 / --- The switch control line for a signal change 20 / --- Out switch. ] --- 2 The body of a note type personal computer, 3 --- A radio antenna, 4 --- A processor, 5

---

[Translation done.]

---

(19)日本国特許庁(JP)

(12) 公開特許公報(A)

(11)特許出願公開番号

特開平5-257897

(43)公開日 平成5年(1993)10月8日

(51)Int.Cl. <sup>5</sup>	識別記号	庁内整理番号	F I	技術表示箇所
G 0 6 F 15/02	3 3 5 E	9194-5L		
H 0 4 B 7/26	U	6942-5K		

審査請求 未請求 請求項の数4(全 4 頁)

(21)出願番号 特願平4-57676

(22)出願日 平成4年(1992)3月16日

(71)出願人 000005108

株式会社日立製作所

東京都千代田区神田駿河台四丁目6番地

(72)発明者 天田 栄一

東京都国分寺市東恋ヶ窪1丁目280番地

株式会社日立製作所中央研究所内

(74)代理人 弁理士 小川 勝男

(54)【発明の名称】 無線アンテナ内蔵型小型計算機

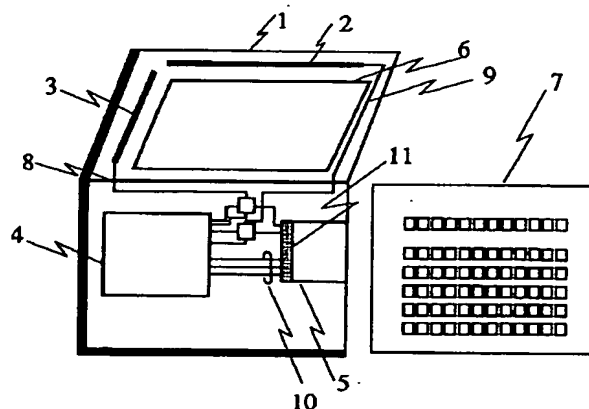
(57)【要約】

【目的】安価で性能のよい無線送受信機能をもつ小型計算機の提供を目的とする。

【構成】小型計算機に無線アンテナを予め内蔵し、内蔵無線アンテナとオプション装置用スロットとの間に配線を装備しておき、オプション装置用スロットに無線送受信装置と一般のオプション装置を選択的に装着して、小型計算機を運用する。

【効果】内蔵されている無線アンテナとオプション用スロットに挿入された無線送受信機とを接続することにより、アンテナのない小型の無線送受信機をオプションとして適用できる。

図1



## 【特許請求の範囲】

【請求項1】 オプション装置を組み込むためのスロットを有する小型計算機において、小型計算機本体に無線アンテナと、無線アンテナをスロットに差し込まれたオプション装置に接続するための配線とを有することを特徴とする無線アンテナ内蔵型小型計算機。

【請求項2】 前記無線アンテナと、小型計算機の処理装置と、前記スロットに差し込まれるオプション装置との間の接続関係を変更するためのスイッチ手段を有することを特徴とする請求項1に記載の無線アンテナ内蔵型小型計算機。

【請求項3】 前記スイッチ手段が、前記小型計算機内の処理装置によって制御されることを特徴とする請求項2に記載の無線アンテナ内蔵型小型計算機。

【請求項4】 前記スイッチ手段を切り換えるための手動スイッチを備えたことを特徴とする請求項2に記載の無線アンテナ内蔵型小型計算機。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は無線アンテナを内蔵し、無線を用いて情報を相互に送受する携帯型の計算機に関する。

## 【0002】

【従来の技術】 無線送受信装置を内蔵した小型携帯計算機の構成法として2つの方法が知られている。第1の方法は、「ワイヤレス インビルディング ネットワークアーキテクチャ アンド プロトコルズ(Wireless In-building Network Architecture and Protocols)、アイイーイーイー ネットワークマガジン (IEEE Network Magazine)、1991年11月号にみられるように、無線送受信装置を計算機の外に設置し、無線送受信装置と計算機間を標準化されたインタフェースで接続する方法である。第2の方法は、米国ブラックボックス社製品「BestLAN」で採用されているように、無線送受信装置をオプション装置用スロットに差し込み、アンテナのみを外付けとしてアンテナと無線送受信装置間をケーブルで接続する方法である。上記2つの方法は既存計算機に無線送受信装置を付加するには最適な方法である。

## 【0003】

【発明が解決しようとする課題】 しかしながら、上記方法を携帯型の小型計算機に適用した場合には無線送受信装置、もしくはアンテナが外部に露出しているため携帯に著しく不便であるという問題がある。したがって、無線アンテナを小型携帯計算機に内蔵することが望ましい。

【0004】 また、無線送受信装置を使用しない利用形態を考えると無線送受信装置はオプション装置を挿入するためのスロットに装着し、無線送受信装置を使用しない場合には他のオプション装置を挿入して使用できることが望ましい。

【0005】 この場合、スロットには異なる種類のオプション装置が装着されるから他のオプション装置のインタフェースに影響を与えない内蔵アンテナと無線送受信装置間の接続方法が必要となる。

## 【0006】

【課題を解決するための手段】 上記問題を解決するため、本発明では、内蔵無線アンテナとオプション装置用スロットコネクタとの間の配線を予め小型計算機内に装備しておき、上記内蔵アンテナとオプション装置用コネクタとの間にスイッチを設け、送受信装置が上記コネクタに装着されたとき、上記内蔵アンテナと送受信装置とを接続できるようにしたことを特徴とする。

## 【0007】

【作用】 本発明によれば、内蔵無線アンテナとオプション装置用スロットコネクタとの間の配線を予め小型計算機に装備しておくことによって、外部の送受信装置機に無線アンテナが不要となり、送受信装置機を小型化できる。また、内蔵アンテナとオプション装置用コネクタとの間にスイッチを設け、内蔵アンテナをオプション装置用スロットコネクタに選択的に接続することによって、他のオプション装置のインタフェースを変更すること無く、無線送受信装置をスロットに挿入して使用することが可能となる。

## 【0008】

【実施例】 図1と図2は、本発明を適用したノート型パーソナルコンピュータの第1の実施例を示す構成図である。図1では、パーソナルコンピュータ本体1からキーボード7を外した状態が示してある。液晶面6の上部と左端に2本のアンテナ2、3が内蔵されており、これらのアンテナは、配線8、9、15および18と、スイッチ12および13とを経由して、オプション装置用コネクタ11に接続されている。この例では、ダイバーシティ受信を可能とし、かつ、受信性能を向上させるために2本のアンテナ2、3が使用されている。

【0009】 スwitch 12、13は、図2に示すように、それぞれ制御信号14、17によって制御され、無線使用時は、アンテナ2、3がオプション装置用コネクタ11と接続される。また、他のオプション装置使用時は、処理装置4をコネクタ11（オプション装置）に接続することにより、従来のオプション装置を接続可能としている。この例では、スイッチ12、13がマイクロプロセッサ（もしくは、マイクロプロセッサを搭載したボード）4によって制御される構成となっているため、オプション装置用スロット5に挿入されたオプション装置の種類を自動的に判別することによって、スイッチ12、13をマイクロプロセッサ（もしくは、マイクロプロセッサを搭載したボード）4で自動的に切り換えることが可能である。なお、10は、オプション装置用スロットと処理装置4とを接続するための配線である図3と図4は、本発明の第2の実施例を示す。第2の実施例で

3

は、スイッチ20が新たに追加され、スイッチ12、13を上記スイッチ20で切り換えるように構成してある。したがって、この実施例では、パーソナルコンピュータの使用者が、オプション装置用スロット5に挿入した機器に応じてスイッチ20を操作し、オプション装置用コネクタ11と、アンテナ2、3と、処理装置4との間の接続を変更する。

【0010】なお、上記スイッチ12、13の制御は、コネクタ11に設置したオプション装置のエッジ形状に応じて動作するスイッチによって制御するようにしてもよい。この場合、スロットにオプション装置または送受信装置を挿入するだけで、自動的にスイッチ12、13の切り換えが可能となる。

【0011】

【発明の効果】以上説明したように、本発明によれば、小型計算機に予め無線通信用のアンテナを内蔵しておき、必要に応じて送受信装置を接続するようになっているため、計算機本体を安価に提供でき、且つ、性能のよ\*

4

\*い無線機能が得られる。また、従来のオプション装置をそのインターフェースを変更することなく使用することが可能となる。

【図面の簡単な説明】

【図1】本発明の第1の実施例を示す計算機の全体構成図。

【図2】上記実施例における要部を示すブロック図。

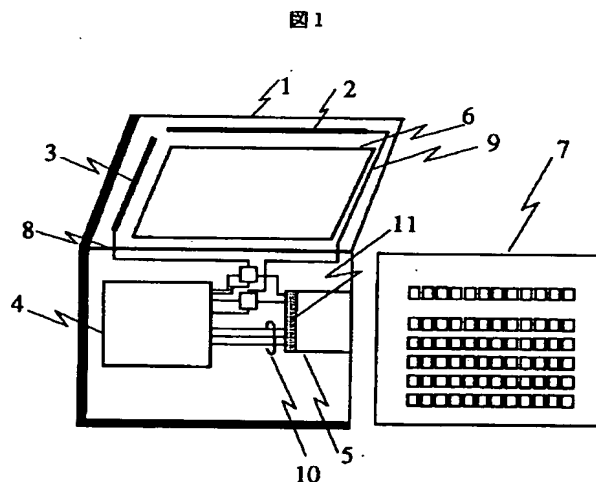
【図3】本発明の第2の実施例を示す計算機の全体構成図。

【図4】上記実施例における要部を示すブロック図。

【符号の説明】

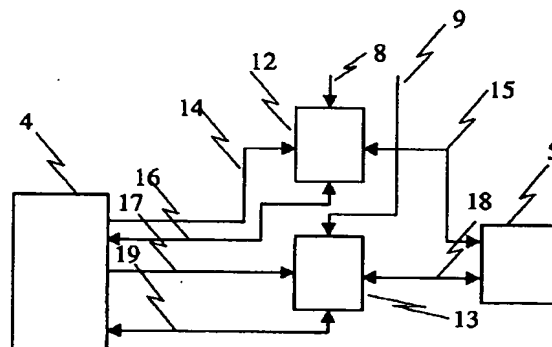
1…ノート型パーソナルコンピュータ本体、2、3…無線アンテナ、4…処理装置、5…オプション装置用スロット、6…液晶、7…キーボード、8、9、10、15、18…配線、11…オプション装置用コネクタ、12、13…信号切り替え用スイッチ、14、17…信号切り替え用スイッチ制御線、20…外部スイッチ。

【図1】



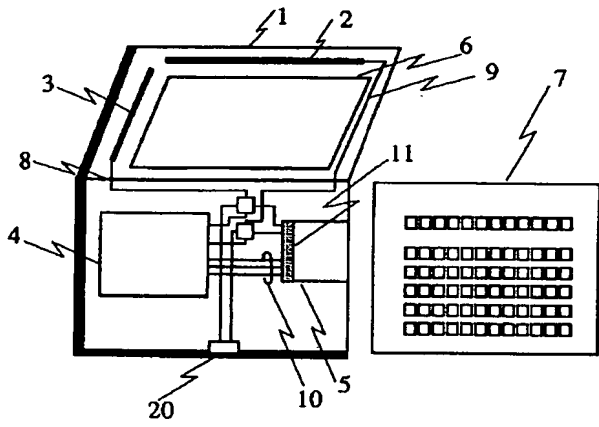
【図2】

図2



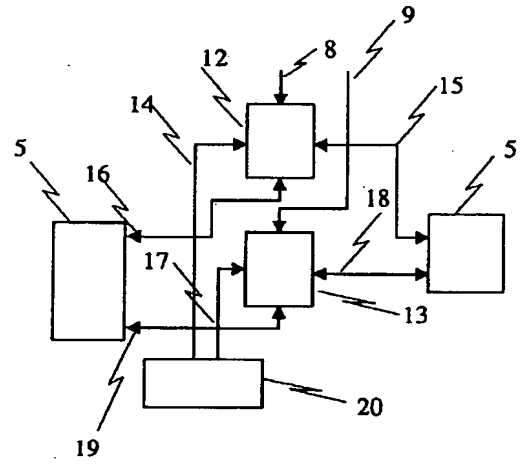
【図3】

図3



【図4】

図4



**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**